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Tax Elasticity Analysis in Romania: 2001 - 2012

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Abstract

This paper contains an analysis of tax revenues sensitivity to changes in gross domestic product in Romania during 2001 - 2012, detailed by types of taxes. Static or dynamic analysis of tax elasticity in Romania is irrelevant without approaches of international comparison, namely at European level. It is relevant to compare the degree of fiscal flexibility in Romania with the average of the 27 European Union member states. Regarding Romania's position in Europe we noticed that elasticity of tax revenues is lower than the EU-27 average and the highest tax elasticity is recorded for consumption taxes.

Keywords: tax elasticity, tax revenues, GDP

1. Introduction

Public revenues are often a bone of contention among public authorities, all the time there is a problem of public money given by their limited nature. Public funds raise the interest of all citizens actively engaged in animating public financial system. Fiscal policy can leave its mark on the conduct of economic and financial processes and thus on the evolution of the entire society. But in turn, it is conditioned by the economic environment through a number of factors, among which stands out: the state of the economy, the relationship between the public and private sectors, income level citizens, etc. Government actions can affect tax revenue through various policies such as, changing the real value of the exchange rate, the level of public debt, the level of interest rate, and the rate of inflation. These factors are important in determining the tax bases at a given moment in time and in determining

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how these bases changes over time with direct effect on buoyancy and elasticity of the tax system. (Brima I., Festus E., 2012)

The largest share of total public funds is represented by tax revenues. Financial policy of any state in terms of revenue reserves a special attention to tax revenues, not by increasing tax revenues due to an increase in tax burden, but as widening the tax base and increasing the number of those involved in the formation of public money. (Comaniciu C., 2005). The fiscal policy of a state is viewed through the perspective of the taxpayers in terms of tax burden, the number of taxes owed, causing an aversion in their eyes. Tax revenues are legal levies taken from the revenue created by companies and individuals, including revenues in relation to taxable properties. These tax revenues are reflected in taxes, fees and social contributions.

Elasticity measures the extent to which a tax structure generates revenues in response to increases in taxpayer income without a change in statutory tax rates. (Craig E.D., Heins A.J., 1980) A clear understanding of the dynamic properties of revenue structures is necessary so that tax structures can be adapted to ensure they generate appropriate revenue growth in the future. (Bruce D., Fox W., Tutle M., 2006). Knowing the form of tax elasticity is important in decision making for the fiscal policy of a country because it allows us to determine the evolution of the total tax revenue collected by the central government. (Bunescu L., Mihaiu D., 2010) It can be identified a number of factors that have a positive or negative influence on tax elasticity, such as the level and nature of tax rates, tax base sensitivity, facilities and tax penalties, taxes management, taxpayer's education, tax information about overall social - economic policies. Quantifying the degree of fiscal flexibility was discussed by other authors: Singer (1968), Chand and Wolf (1973), Khan (1973), Artus (1974) or Ehdaie Jaber (1990), each one developed an econometric model measurement. Ehdaie Jaber's model takes into account interaction of GDP, tax revenues, the structure of the tax system, the tax base using time series data for analysis and a model based on logarithmic functions. Tax elasticities can be affected by changes in tax compliance, since firms and households are more likely to evade taxes when they are credit constrained or financially depressed. (Poghosyn T., 2011)

From a structural point of view, the paper presents in the second section the methodology of calculation for tax elasticity from our perspective, the third and forth section presents the results obtained in Romania and the EU, and in the last part we pointed some general conclusions.

2. Methodology

In a time perspective (on short or long term) tax revenues collected to national budget suffer a number of changes in terms of flow and rhythm collection as a result of changes in the factors that influence them. Impact analysis of factors influencing these changes can be achieved by studying the magnitude. The method used to measure the reaction, the sensitivity of tax revenues to changes in a variable is elasticity. It can be measured by a coefficient of elasticity of tax revenues by GDP considering other factors unchanged (ceteris paribus).

$$\text{Tax elasticity} = \frac{\text{Relative change of tax revenues}}{\text{Relative change of GDP}} \quad (1)$$

Elasticity of tax revenues by GDP is a movement of response or reaction of tax revenues to a movement or fluctuation in GDP. A null value of tax elasticity indicates that an infinite variation in GDP will cause a totally non-collection of tax revenues as a result of self-defense taxpayer's reaction. Tax elasticity shows the ratio of relative change in tax revenue and relative variation in GDP for a given country. It expresses direct and indirect tax levies' sensitivity to changes in GDP or other conditions of public revenues (tax pressure).

Tax revenue elasticity coefficient (Ef/GDP) is the rate, fraction or percentage change of compulsory levies according to the change in GDP or other terms of tax revenue (e.g. tax pressure). The general form of tax elasticity coefficient by GDP is:

$$E_{f/GDP} = \frac{\Delta\%TR}{\Delta\%GDP} = \frac{\frac{\Delta TR}{TR0}\times 100}{\frac{\Delta GDP}{GDP0}\times 100} = \frac{\Delta TR}{TR0} \div \frac{\Delta GDP}{GDP0} = \frac{\Delta TR}{\Delta GDP} \times \frac{GDP0}{TR0} \quad (2)$$

Where: TR – tax revenues, GDP – Gross Domestic Product

Tax elasticity depending on GDP variation determines how strongly tax revenues collected to central government react to a change by a percentage of GDP.

Table 1: Types of elasticity

Type of elasticity		Evolution
| Ef/GDP | = ∞	Tax revenues – perfect elastic	A minimal change in GDP leads to a maximum change in tax revenues
| Ef/GDP | > 1	Tax revenues - elastic	A change in GDP leads to an over proportional change in tax revenue
| Ef/GDP | = 1	Tax revenues – unitary elastic	A change in GDP by 1% leads to a change in tax revenue by 1%
| Ef/GDP | < 1	Tax revenues - inelastic	A change in GDP leads to a less proportional change in tax revenues
| Ef/GDP | = 0	Tax revenues – perfect inelastic	A maximum change in GDP does not cause a change in tax revenues

3. Tax elasticity in Romania

It is considered the following table where are centralized budget executions in terms of public revenues in Romania in the period 2006 to 2012. Data were collected from the Consolidated General Budget, accordingly the "tax revenue" does not include contributions due by taxpayers to social, health or unemployment security, but only taxes levied to the state or local budgets. Starting from the consideration that the taxpayer, natural or legal person, has not to pay only taxes and fees, but social contributions too, we made a tax elasticity analysis based on changes in GDP, differentiated by tax levies as taxes and total levies after including social contributions in them.

Table 2: Evolution of revenues from the General Consolidated Budget - Romania 2006-2012 (million lei)

Year	Tax revenues GCB	GDP	Direct taxes	Indirect taxes	Social contributions	Total tax revenues (GCB)	$E_{f/PIB}$ (I)	$E_{f/PIB}$ (II)
2012	114044,6	585200,0	36843,3	77201.4	51658.3	165703,0	1,31	0,98
2011	104687,0	547829,0	34082,9	70604,0	50637,3	155324,3	1,76	1,69
2010	93060,1	511581,0	32727,6	60332,5	45697,2	138757,3	4,46	1,56
2009	88324,3	505503,0	35207,6	53116,7	47872,0	136196,3	3,72	2,69
2008	94044,4	513904,0	36283,0	57761,6	48419,8	142464,2	0,73	0,75
2007	76365,8	390800,0	26319,0	46061,2	38843,0	115208,8	1,21	1,17

2006	63792,4	335900,0	19105,2	39448,0	32981,4	96773,8	-	-

Source: http://www.mfinante.ro/execbug.html, Ministry of Finance, provisional execution of the General Consolidated Budget and own calculations

Analysis of the tax revenues sensitivity to changes of 1% of GDP in the period 2006-2012 revealed a positive coefficient of elasticity, whatever the consideration of the amounts included in the numerator, reflecting proportional relationship between GDP and compulsory levies. In other words the two indicators have evolved in the same direction, but not by the same rate. A positive growth is followed by a trend in the same direction of tax levies, while a decrease in GDP value resulted in a decrease in the amount of taxes collected by state.

Type of tax elasticity is not uniform, but it varies year by year, alternating the phases in that tax revenues are elastic or inelastic in relation to GDP. During 2008 - 2009 tax obligations collected by public authorities are characterized by elasticity, with an elasticity coefficient of 2.69, higher than 1. This indicates that the decrease in GDP in 2009 compared to 2008, by 1.6%, led to a more comprehensive amendment, in a negative way, of overall taxes collected at the aggregate level. During 2007 - 2008 the calculations show a coefficient of tax elasticity by GDP less than 1, of 0.75, therefore compulsory levies are inelastic, an increase by 31.5% of GDP led to a lower increase in government tax revenue by 23.66%.

The period 2009-2010 is characterized by fiscal elasticity, GDP growth by 1% caused a tax levy increased by 1.56%. Differentiated tax elasticity analysis, including or excluding social contributions, leads us to affirm that taxes have a higher degree of flexibility, they are more sensitive to changes in GDP than social contributions. The coefficient of elasticity higher than one during 2010/2009 (4.46) indicates that an increase in GDP of 1.20% in 2010 generated an increase in amounts collected as taxes by 5.36%, i.e. 4.5 times higher. For the last analyzed years, positive and higher than 1 elasticity coefficients of 1.76, respectively 1.31, reinforce the conclusions outlined above.

Table 3: Evolution of the National Public Budget tax revenue and tax elasticity in Romania between 2000 - 2012 (million lei)

Year	State budget	Social security budget	Local budget	Total fiscal revenues of National Public Budget	GDP	$E_{\ell/PIB}$
2012	75615,8	35527,6	34447,9	145591,3	585200,0	0,89
2011	69527,7	34663,0	33023,9	137213,7	547829,0	1,78
2010	56304,7	31806,5	34542,9	122654,1	513640,8	1,60
2009	48152,9	33066,6	36731,5	117951,0	501139,4	1,83
2008	55133,6	31448,0	37346,0	123927,6	514700,0	1,04
2007	44824,2	24397,3	30108,9	99330,4	416006,8	0,93
2006	37900,2	20185,9	25236,8	83322,9	344650,6	0,49
2005	34531,2	17394,8	24144,7	76070,7	288954,6	0,88
2004	30252,7	14249,2	21771,7	66273,6	247368,0	0,97
2003	23602,3	11305,9	18258,8	53167,0	197427,6	1,22
2002	16775,3	9075,0	13103,9	38954,2	152017,0	1,20
2001	13727,7	6828,9	8395,2	28951,8	117946,0	0,66
2000	11439,4	4696,9	6143,0	22279,3	80984,6	-

Source: Statistical Yearbooks of Romania in the period 2001-2009 and executions of the General Consolidated Budget for 2010-2012, Ministry of Finance and author calculations

The lack of public information regarding execution of Consolidated General Budget of Romania in the last 12 years, especially their late publication, leads us to analyze sensitivity of tax levy by the three components of the National Public Budget. As shown in the table from above, in Romania fiscal obligations are characterized by the predominance of unitary elasticity (2012, 2008, 2007, 2005, 2004), but high sensitivity of taxes is met in the past years, 2009, 2010 and 2011 , and years with fiscal inelasticity too (2006, 2001).

The highest degree of flexibility in last 12 years in Romania was recorded in 2009 as compared to 2008, the recession bringing a faster decrease in tax levies of National Public Budget as compared to that of GDP in the same period. The greatest degree of fiscal inelasticity occurred in 2006 of 0.49. A 19.3% increase in GDP caused an increase of only 9.5% in compulsory levies to National Public Budget. For 2011 the coefficient of elasticity showed a positive value of 1.78, indicating that GDP increase by 6.6% in 2011 as compared to 2011 was followed by an increase in tax revenues of the three basic budgets by 11.8%, i.e. 1.78 times. But in 2012 GDP increased by 6.8% and led to a change in the same way of tax revenues by 6.1%.

4. Tax elasticity at European Union level

Static or dynamic analysis of tax elasticity in Romania is irrelevant without approaches of international comparison, namely at European level. From this point of view we believe that is relevant to compare the degree of fiscal flexibility in Romania with the average of the 27 European Union member states. We opted for a comparative analysis between the 27 Member States between 2006 to 2010, having as starting point the data series for GDP statistics provided by Eurostat and European Commission publication "Taxation trends in the European Union" in 2008-2012 expressed in million euro for GDP, total tax revenues including contributions, indirect taxes, direct taxes and social contributions. Databases were accessed on 15/01/2013 and are centralized in line with ESA95, the last set of data is for 2009.

Table 4: Tax elasticity matrix in the EU-27 2009/2008

Type of revenues	Perfect inelasticity (0 – 0,25)	Inelasticity (0,26-0,90)	Unitary elasticity (0,91-1,2)	Elasticity (>1,20)
Global tax revenues	LU	DE, EE, IT, SI	DK, LT, HU, AT, FI, SE	BE, EL, BG, ES, BG, FR, UK, IE, CY, NL, PT, PL, LV, RO, MT, SK
Indirect taxes	-	CZ, DE, EE, FI, FR, SE, LU, HU, AT, SI	LV, LT	BE, BG, IE, IT, DK, EL, CY, ES, SK, MT, PL, PT, UK, NL, RO
Direct taxes	LU, SE	DK, NL	EE, IT, RO	BE, CZ, FR, BG, DE, AT, IE, EL, PL, PT, CY, ES, LV, LT, SI, HU, MT, SK, UK, FI
Social contributions	DE, EE, FR, IT, SI, FI	DK, ES, IE, AT, LV, LT	PL, RO, SK, UK	BE, BG, CZ, EL, CY, LU, HU, MT, PT, NL, SE

Source: Own calculations

In 2009 – 2008, the average level of tax elasticity by GDP in the EU-27 recorded a value of 1.38, which means that European countries are dealing with elasticity, a value that follows a period of inelasticity in 2008/2007 of 0.45 and one period of unitary elasticity with a coefficient of 0.97. The positive sign of tax sensitivity coefficient for 26 states (except Luxembourg) indicates a trend in the same direction of aggregate GDP and taxes paid by all taxpayers in the European Community, individuals or businesses.

A reduction of EU GDP in 2009 by 5.7%, to 11,752,175 mln €, generated a negative trend of tax levy by 7.9% to 4,531,544 mln €. In the EU-27 is apparent a predominance of tax elasticity coefficients higher than one in 16 Member States, six states where it tends to 0 and five states with fiscal inelasticity. Among countries with tax elasticity, Luxembourg customizes by a coefficient which tends to 0. From a structural point of view it can be seen

that the most elastic categories of revenue are those from taxation, especially taxes on profits and property. These feel a faster and more intense impact of any changes in GDP (20 countries out of 27 have ratios higher than one). It should be noted four exceptions for countries where tax systems are based on direct and progressive taxation, which are characterized by inelasticity. A high inelasticity characterizes the receipts from taxes on consumption in ten Member States in 2009, but the most inelastic to changes in GDP are social contributions receipts. Moreover, in 2009, the change has no impact on countries such as Germany, Estonia, France, Italy, Slovenia, Finland, for other 6 states it induce a change lower than the GDP's change, and in 4 states the changes were in the same proportion. In terms of tax elasticity coefficient in the EU-27, the value ranges from 0.11 in Luxembourg to 87.74 in Greece, for indirect taxes from 0.28 in Austria to 87.74 in Malta, for direct taxes from 0.02 in Sweden to 10.23 in Bulgaria and for social contributions between 0.03 in Italy to 31.94 in Greece.

5. Conclusions

Regarding Romania's position in Europe we noticed that in all four cases the country is characterized by a lower elasticity of tax revenues than the EU-27 average. The highest tax elasticity is recorded for consumption taxes of 1.47, 0.19 over the EU-27 average. In 2009, direct taxes recorded a tax elasticity coefficient higher than one (1.20), below the EU-27 average of 2.1. Social contributions in Romania had an unitary tax elasticity for a change by 1 percent of GDP, with a coefficient of 0.98 while the average EU-27 indicates inelasticity for this variable. EU-27 is characterized by heterogeneity in terms of tax elasticity and may not create uniform patterns across all 27 countries.

Summarizing the above ideas, we cannot create patterns regarding the sensitivity of tax revenues to GDP changes, developments of elasticity coefficients and alternatives of elasticity / inelasticity are not based on a uniform rule, they differ from one country to another, more, even in the same country from one period to another.

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